

USSN 10/808,157
Attorney Docket No. 2003-0022-01

IN THE CLAIMS:

1. (original) A high power narrow band, high repetition rate laser light source system line narrowing unit comprising:

a fast moving angularly positionable tuning mirror comprising:

a mirror mounting frame comprising a first material and a relatively flat mounting surface area;

a reflective optic comprising a second material having a coefficient of thermal expansion different from that of the first material of the mounting frame;

at least two attachment points of attachment between the mounting frame and the reflective optic on the mounting frame surface; and,

at least one flexure mount formed in the mounting frame that is flexible in a flexure axis corresponding to a longitudinal axis of thermal expansion of the mounting frame and the reflective optic, positioned at one of the at least two points of attachment.

2. (original) The apparatus of claim 1, further comprising:

the flexure mount comprises:

a flexure body formed from the material of the mirror mounting frame and separated from the material of the mirror mounting frame to allow relative movement between the flexure and the mirror mounting frame;

at least one flexure arm formed from the material of the mirror mounting frame and attached at one end to the mirror mounting frame and at the other end to the flexure.

3. (original) The apparatus of claim 1 further comprising:

the at least one flexure arm comprises a first and a second flexure arm oppositely positioned on either side of the flexure body generally orthogonal to the flexure axis.

4. (original) The apparatus of claim 2 further comprising:

USSN 10/808,157
Attorney Docket No. 2003-0022-01

the at least one flexure arm comprises a first and a second flexure arm oppositely positioned on either side of the flexure body generally orthogonal to the flexure axis.

5. (original) The apparatus of claim 1 further comprising:

a flexure force mechanism made of the second material or a third material having a coefficient of thermal expansion that is essentially the same as that of the second material;

the flexure force mechanism comprising an elongated rod;

a flexure force mechanism slot generally aligned with the flexure axis and sized to snugly fit the flexure force mechanism between a slot wall at one end of the flexure force mechanism slot and the flexure body at the other end of the flexure force mechanism slot.

6. (original) The apparatus of claim 2 further comprising:

a flexure force mechanism made of the second material or a third material having a coefficient of thermal expansion that is essentially the same as that of the second material;

the flexure force mechanism comprising an elongated rod;

a flexure force mechanism slot generally aligned with the flexure axis and sized to snugly fit the flexure force mechanism between a slot wall at one end of the flexure force mechanism slot and the flexure body at the other end of the flexure force mechanism slot.

7. (original) The apparatus of claim 3 further comprising:

a flexure force mechanism made of the second material or a third material having a coefficient of thermal expansion that is essentially the same as that of the second material;

the flexure force mechanism comprising an elongated rod;

a flexure force mechanism slot generally aligned with the flexure axis and sized to snugly fit the flexure force mechanism between a slot wall at one end of the flexure

USSN 10/808,157
Attorney Docket No. 2003-0022-01

force mechanism slot and the flexure body at the other end of the flexure force mechanism slot.

8. (original) The apparatus of claim 4 further comprising:

a flexure force mechanism made of the second material or a third material having a coefficient of thermal expansion that is essentially the same as that of the second material;

the flexure force mechanism comprising an elongated rod;

a flexure force mechanism slot generally aligned with the flexure axis and sized to snugly fit the flexure force mechanism between a slot wall at one end of the flexure force mechanism slot and the flexure body at the other end of the flexure force mechanism slot.

9. (original) The apparatus of claim 5 further comprising:

the flexure is pre-stressed by the flexure force rod.

10. (original) The apparatus of claim 6 further comprising:

the flexure is pre-stressed by the flexure force rod.

11. (original) The apparatus of claim 7 further comprising:

the flexure is pre-stressed by the flexure force rod.

12. (original) The apparatus of claim 8 further comprising:

the flexure is pre-stressed by the flexure force rod.

13. (withdrawn) A high fluence line narrowing unit comprising:

a grating comprising:

a grating substrate;

a thin layer of metallic reflective coating on the grating substrate;

USSN 10/808,157
Attorney Docket No. 2003-0022-01

a protective coating over the reflective coating comprising a dense glassy material that is essentially non-porous to undesired contaminants exposure of which to the reflective coating is desired to be prevented.

14. (withdrawn) The apparatus of claim 13 further comprising:

the protective coating comprises a material that is essentially transparent to DUV light.

15. (withdrawn) The apparatus of claim 13 further comprising:

the protective coating comprises an amorphous silica.

16. (withdrawn) The apparatus of claim 14 further comprising:

the protective coating comprises an amorphous silica.

17. (withdrawn) The apparatus of claim 13 further comprising:

the protective coating comprises a doped amorphous silica.

18. (withdrawn) The apparatus of claim 14 further comprising:

the protective coating comprises a doped amorphous silica.

19. (withdrawn) The apparatus of claim 15 further comprising:

the protective coating comprises a doped amorphous silica.

20. (withdrawn) The apparatus of claim 16 further comprising:

the protective coating comprises a doped amorphous silica.

21. (withdrawn) The apparatus of claim 17 further comprising:

the protective coating comprises a halide doped fused silica.

22. (withdrawn) The apparatus of claim 18 further comprising:

the protective coating comprises a halide doped fused silica.

USSN 10/808,157
Attorney Docket No. 2003-0022-01

23. (withdrawn) The apparatus of claim 19 further comprising:
the protective coating comprises a halide doped fused silica.
24. (withdrawn) The apparatus of claim 20 further comprising:
the protective coating comprises a halide doped fused silica.
25. (withdrawn) The apparatus of claim 21 further comprising:
the protective coating comprises fluorine doped fused silica.
26. (withdrawn) The apparatus of claim 22 further comprising:
the protective coating comprises fluorine doped fused silica.
27. (withdrawn) The apparatus of claim 23 further comprising:
the protective coating comprises fluorine doped fused silica.
28. (withdrawn) The apparatus of claim 24 further comprising:
the protective coating comprises fluorine doped fused silica.
29. (provisionally withdrawn) A high power narrow band, high repetition rate laser light source system line narrowing unit comprising:
a line narrowing optic mounting frame comprising a first material and a relatively flat mounting surface area;
a line narrowing optic comprising a second material having a coefficient of thermal expansion different from that of the first material of the mounting frame;
a flexure mount formed in the mounting frame that is flexible in a flexure axis corresponding to a longitudinal axis of thermal expansion of the mounting frame and the line narrowing optic;
a flexure force mechanism made of the second material or a third material having a coefficient of thermal expansion that is essentially the same as that of the second material;

USSN 10/808,157
Attorney Docket No. 2003-0022-01

the flexure force mechanism comprising an elongated rod;

a flexure force mechanism slot generally aligned with the flexure axis and sized to snugly fit the flexure force bar between a slot wall at one end of the flexure force mechanism slot and the flexure body at the other end of the flexure force mechanism slot.

30. (provisionally withdrawn) The apparatus of claim 29 further comprising:
the flexure is pre-stressed with the flexure force rod.

31. (provisionally withdrawn) The apparatus of claim 29 further comprising:
the line narrowing optic is a grating.

32. (provisionally withdrawn) The apparatus of claim 30 further comprising:
the line narrowing optic is a grating.

33. (provisionally withdrawn) The apparatus of claim 29 further comprising:
the line narrowing optic is a tuning mirror.

34. (provisionally withdrawn) The apparatus of claim 30 further comprising:
the line narrowing optic is a tuning mirror.

35. (withdrawn) A high power narrow band, high repetition rate laser light source system line narrowing unit comprising:

a grating mounted on a grating mount;

a high speed actively controlled electro- or magneto-sensitive bending or twisting actuator attached to either the grating or the grating mount to actively control the bending or twisting of the grating.

36. (withdrawn) The apparatus of claim 35 further comprising:
the electro- or magneto-sensitive bending or twisting actuator is a plurality of electro- and/or magneto-sensitive bending or twisting actuators.

USSN 10/808,157

Attorney Docket No. 2003-0022-01

37. (withdrawn) A high power narrow band, high repetition rate laser light source system comprising:

an optical element exposed to high fluence DUV light comprising a reflective metallic layer;

a purge system comprising a purge gas comprising hydrogen exposing the optical element to the purge gas during exposure to DUV light.

38. (withdrawn) A high power narrow band, high repetition rate laser light source system optical element restoration apparatus comprising:

a vessel;

an optical element which has been exposed to high fluence DUV light comprising a reflective metallic layer contained in the vessel;

a purge system comprising a purge gas comprising hydrogen connected to the vessel exposing the optical element to the purge gas;

a source of DUV light irradiating the optical element reflective metallic layer.

39. (withdrawn) A mechanism for removing an oxide of a metal comprising a reflective coating on an optical element utilized in a DUV light source which oxide was formed under exposure to DUV light during operation of a DUV laser light source, in the presence of oxygen, comprising:

a gas supply mechanism exposing the optical element to a source of hydrogen while irradiating the optical element with DUV light.

40. (withdrawn) The apparatus of claim 39 further comprising:

the gas supply mechanism is connected to an enclosure in the DUV light source during operation of the DUV light source.

41. (withdrawn) The apparatus of claim 39 further comprising:

the gas supply mechanism is connected to an enclosure separated from the DUV light source during operation of the DUV light source.

USSN 10/808,157

Attorney Docket No. 2003-0022-01

42. (withdrawn) A high power narrow band, high repetition rate laser DUV light source system optical element housing comprising:

- a mounting recess;

- a seal member contained within the mounting recess and subject to deterioration when exposed to DUV light;

- an annular DUV shield coating on the optical element interposed between the DUV light source and the seal member.

43. (original) A high power narrow band, high repetition rate laser light source system line narrowing unit comprising:

- a fast moving angularly positionable tuning mirror comprising:

- a mirror mounting frame comprising a first material and a relatively flat mounting surface area;

- a reflective optic comprising a second material having a coefficient of thermal expansion different from that of the first material of the mounting frame;

- at least two attachment points of attachment between the mounting frame and the reflective optic on the mounting frame surface; and,

- at least one flexure mounting means formed in the mounting frame that is flexible in a flexure axis corresponding to a longitudinal axis of thermal expansion of the mounting frame and the reflective optic, positioned at one of the at least two points of attachment.

44. (original) The apparatus of claim 43, further comprising:

- the flexure mounting means comprises:

- a flexure body formed from the material of the mirror mounting frame and separated from the material of the mirror mounting frame to allow relative movement between the flexure and the mirror mounting frame;

- at least one flexure movement means formed from the material of the mirror mounting frame and attached at one end to the mirror mounting frame and at the other end to the flexure.

USSN 10/808,157
Attorney Docket No. 2003-0022-01

45. (original) The apparatus of claim 43 further comprising:

the at least one flexure movement means comprises a first and a second flexure arm oppositely positioned on either side of the flexure body generally orthogonal to the flexure axis.

46. (original) The apparatus of claim 44 further comprising:

the at least one flexure movement means comprises a first and a second flexure arm oppositely positioned on either side of the flexure body generally orthogonal to the flexure axis.

47. (original) The apparatus of claim 43 further comprising:

a flexure forcing means made of the second material or a third material having a coefficient of thermal expansion that is essentially the same as that of the second material;

a flexure forcing means slot generally aligned with the flexure axis and sized to snugly fit the flexure forcing means between a slot wall at one end of the flexure forcing means slot and the flexure body at the other end of the flexure forcing means slot.

48. (original) The apparatus of claim 44 further comprising:

a flexure forcing means made of the second material or a third material having a coefficient of thermal expansion that is essentially the same as that of the second material;

a flexure forcing means slot generally aligned with the flexure axis and sized to snugly fit the flexure forcing means between a slot wall at one end of the flexure forcing means slot and the flexure body at the other end of the flexure forcing means slot.

49. (original) The apparatus of claim 45 further comprising:

a flexure forcing means made of the second material or a third material having a coefficient of thermal expansion that is essentially the same as that of the second material;

USSN 10/808,157
Attorney Docket No. 2003-0022-01

a flexure forcing means slot generally aligned with the flexure axis and sized to snugly fit the flexure forcing means between a slot wall at one end of the flexure forcing means slot and the flexure body at the other end of the flexure forcing means slot.

50. (original) The apparatus of claim 46 further comprising:

a flexure forcing means made of the second material or a third material having a coefficient of thermal expansion that is essentially the same as that of the second material;

a flexure forcing means slot generally aligned with the flexure axis and sized to snugly fit the flexure forcing means between a slot wall at one end of the flexure forcing means slot and the flexure body at the other end of the flexure forcing means slot.

51. (original) The apparatus of claim 47 further comprising:

the flexure is pre-stressed by the flexure forcing means.

52. (original) The apparatus of claim 48 further comprising:

the flexure is pre-stressed by the flexure forcing means.

53. (original) The apparatus of claim 49 further comprising:

the flexure is pre-stressed by the flexure forcing means.

54. (original) The apparatus of claim 50 further comprising:

the flexure is pre-stressed by the flexure forcing means.

55. (withdrawn) A high fluence line narrowing unit comprising:

a grating comprising:

a grating substrate;

a thin layer of metallic reflective coating on the grating substrate;

a protective coating means over the reflective coating comprising a dense glassy material that is essentially non-porous to undesired contaminants exposure of which to the reflective coating is desired to be prevented.

USSN 10/808,157
Attorney Docket No. 2003-0022-01

56. (withdrawn) The apparatus of claim 55 further comprising:
the protective coating means comprises a material that is essentially transparent to DUV light.
57. (withdrawn) The apparatus of claim 55 further comprising:
the protective coating means comprises an amorphous silica.
58. (withdrawn) The apparatus of claim 56 further comprising:
the protective coating means comprises an amorphous silica.
59. (withdrawn) The apparatus of claim 55 further comprising:
the protective coating means comprises a doped amorphous silica.
60. (withdrawn) The apparatus of claim 56 further comprising:
the protective coating means comprises a doped amorphous silica.
61. (withdrawn) The apparatus of claim 57 further comprising:
the protective coating means comprises a doped amorphous silica.
62. (withdrawn) The apparatus of claim 58 further comprising:
the protective coating means comprises a doped amorphous silica.
63. (withdrawn) The apparatus of claim 59 further comprising:
the protective coating means comprises a halide doped fused silica.
64. (withdrawn) The apparatus of claim 60 further comprising:
the protective coating means comprises a halide doped fused silica.
65. (withdrawn) The apparatus of claim 61 further comprising:
the protective coating means comprises a halide doped fused silica.

USPN 10/808,157
Attorney Docket No. 2003-0022-01

66. (withdrawn) The apparatus of claim 62 further comprising:
the protective coating means comprises a halide doped fused silica.
67. (withdrawn) The apparatus of claim 63 further comprising:
the protective coating means comprises fluorine doped fused silica.
68. (withdrawn) The apparatus of claim 64 further comprising:
the protective coating means comprises fluorine doped fused silica.
69. (withdrawn) The apparatus of claim 65 further comprising:
the protective coating means comprises fluorine doped fused silica.
70. (withdrawn) The apparatus of claim 66 further comprising:
the protective coating means comprises fluorine doped fused silica.
71. (provisionally withdrawn) A high power narrow band, high repetition rate laser light source system line narrowing unit comprising:
a line narrowing optic mounting frame comprising a first material and a relatively flat mounting surface area;
a line narrowing optic comprising a second material having a coefficient of thermal expansion different from that of the first material of the mounting frame;
a flexure mount formed in the mounting frame that is flexible in a flexure axis corresponding to a longitudinal axis of thermal expansion of the mounting frame and the line narrowing optic;
a flexure force means made of the second material or a third material having a coefficient of thermal expansion that is essentially the same as that of the second material;
a flexure force means slot generally aligned with the flexure axis and sized to snugly fit the flexure force means between a slot wall at one end of the flexure force means slot and the flexure body at the other end of the flexure force means slot.

USSN 10/808,157
Attorney Docket No. 2003-0022-01

72. (provisionally withdrawn) The apparatus of claim 71 further comprising:
the flexure is pre-stressed with the flexure force means.
73. (provisionally withdrawn) The apparatus of claim 71 further comprising:
the line narrowing optic is a grating.
74. (provisionally withdrawn) The apparatus of claim 72 further comprising:
the line narrowing optic is a grating.
75. (provisionally withdrawn) The apparatus of claim 71 further comprising:
the line narrowing optic is a tuning mirror.
76. (provisionally withdrawn) The apparatus of claim 72 further comprising:
the line narrowing optic is a tuning mirror.
77. (withdrawn) A high power narrow band, high repetition rate laser light source system
line narrowing unit comprising:
a grating mounted on a grating mount;
a high speed actively controlled electro- or magneto-sensitive bending or twisting
actuator means attached to either the grating or the grating mount to actively control the
bending or twisting of the grating.
78. (withdrawn) The apparatus of claim 77 further comprising:
the electro- or magneto-sensitive bending or twisting actuator means is a plurality
of electro- and/or magneto-sensitive bending or twisting actuators.
79. (withdrawn) A high power narrow band, high repetition rate laser light source system
comprising:
an optical element exposed to high fluence DUV light comprising a reflective
metallic layer;

USSN 10/808,157
Attorney Docket No. 2003-0022-01

a purge system means comprising a purge gas comprising hydrogen exposing the optical element to the purge gas during exposure to DUV light.

80. (withdrawn) A high power narrow band, high repetition rate laser light source system optical element restoration apparatus comprising:

a vessel;

an optical element which has been exposed to high fluence DUV light comprising a reflective metallic layer contained in the vessel;

a purge system means comprising a purge gas comprising hydrogen connected to the vessel for exposing the optical element to the purge gas;

a source of DUV light irradiating the optical element reflective metallic layer.

81. (withdrawn) A mechanism for removing an oxide of a metal comprising a reflective coating on an optical element utilized in a DUV light source which oxide was formed under exposure to DUV light during operation of a DUV laser light source, in the presence of oxygen, comprising:

a gas supply means for exposing the optical element to a source of hydrogen while irradiating the optical element with DUV light.

82. (withdrawn) The apparatus of claim 81 further comprising:

the gas supply means is connected to an enclosure in the DUV light source during operation of the DUV light source.

83. (withdrawn) The apparatus of claim 81 further comprising:

the gas supply mechanism is connected to an enclosure separated from the DUV light source during operation of the DUV light source.

84. (withdrawn) A high power narrow band, high repetition rate laser DUV light source system optical element housing comprising:

a mounting recess;

USSN 10/808,157
Attorney Docket No. 2003-0022-01

a seal member contained within the mounting recess and subject to deterioration when exposed to DUV light;

an annular DUV shield means on the optical element interposed between the DUV light source and the seal member.

85. (original) A high power narrow band, high repetition rate laser light source system line narrowing method comprising:

utilizing a fast moving angularly positionable tuning mirror to tune a bandwidth spectrum comprising:

using a mirror mounting frame comprising a first material and a relatively flat mounting surface area;

using a reflective optic comprising a second material having a coefficient of thermal expansion different from that of the first material of the mounting frame;

providing at least two attachment points of attachment between the mounting frame and the reflective optic on the mounting frame surface; and,

providing at least one flexure mounting mechanism formed in the mounting frame that is flexible in a flexure axis corresponding to a longitudinal axis of thermal expansion of the mounting frame and the reflective optic, positioned at one of the at least two points of attachment.

86. (original) The method of claim 85, further comprising:

the flexure mounting mechanism comprises:

a flexure body formed from the material of the mirror mounting frame and separated from the material of the mirror mounting frame to allow relative movement between the flexure and the mirror mounting frame;

at least one flexure movement mechanism formed from the material of the mirror mounting frame and attached at one end to the mirror mounting frame and at the other end to the flexure.

USSN 10/808,157
Attorney Docket No. 2003-0022-01

87. (original) The method of claim 85 further comprising:

the at least one flexure movement mechanism comprises a first and a second flexure arm oppositely positioned on either side of the flexure body generally orthogonal to the flexure axis.

88. (original) The method of claim 86 further comprising:

the at least one flexure movement mechanism comprises a first and a second flexure arm oppositely positioned on either side of the flexure body generally orthogonal to the flexure axis.

89. (original) The method of claim 85 further comprising:

providing a flexure forcing mechanism made of the second material or a third material having a coefficient of thermal expansion that is essentially the same as that of the second material;

providing a flexure forcing mechanism slot generally aligned with the flexure axis and sized to snugly fit the flexure forcing mechanism between a slot wall at one end of the flexure forcing mechanism slot and the flexure body at the other end of the flexure forcing mechanism slot.

90. (original) The method of claim 86 further comprising:

providing a flexure forcing mechanism made of the second material or a third material having a coefficient of thermal expansion that is essentially the same as that of the second material;

providing a flexure forcing mechanism slot generally aligned with the flexure axis and sized to snugly fit the flexure forcing mechanism between a slot wall at one end of the flexure forcing mechanism slot and the flexure body at the other end of the flexure forcing mechanism slot.

91. (original) The method of claim 87 further comprising:

USSN 10/808,157

Attorney Docket No. 2003-0022-01

providing a flexure forcing mechanism made of the second material or a third material having a coefficient of thermal expansion that is essentially the same as that of the second material;

providing a flexure forcing mechanism slot generally aligned with the flexure axis and sized to snugly fit the flexure forcing mechanism between a slot wall at one end of the flexure forcing mechanism slot and the flexure body at the other end of the flexure forcing mechanism slot.

92. (original) The method of claim 88 further comprising:

providing a flexure forcing mechanism made of the second material or a third material having a coefficient of thermal expansion that is essentially the same as that of the second material;

providing a flexure forcing mechanism slot generally aligned with the flexure axis and sized to snugly fit the flexure forcing mechanism between a slot wall at one end of the flexure forcing mechanism slot and the flexure body at the other end of the flexure forcing mechanism slot.

93. (original) The method of claim 89 further comprising:

the flexure is pre-stressed by the flexure forcing mechanism.

94. (original) The method of claim 90 further comprising:

the flexure is pre-stressed by the flexure forcing mechanism.

95. (original) The method of claim 91 further comprising:

the flexure is pre-stressed by the flexure forcing mechanism.

96. (original) The method of claim 92 further comprising:

the flexure is pre-stressed by the flexure forcing mechanism.

97. (withdrawn) A high fluence line narrowing method comprising:

utilizing a grating comprising:

USSH 10/808,157
Attorney Docket No. 2003-0022-01

a grating substrate;
a thin layer of metallic reflective coating on the grating substrate;
utilizing a protective coating over the reflective coating comprising a dense glassy material that is essentially non-porous to undesired contaminants exposure of which to the reflective coating is desired to be prevented.

98. (withdrawn) The method of claim 97 further comprising:
the protective coating comprises a material that is essentially transparent to DUV light.

99. (withdrawn) The method of claim 97 further comprising:
the protective coating comprises an amorphous silica.

100. (withdrawn) The method of claim 98 further comprising:
the protective coating comprises an amorphous silica.

101. (withdrawn) The method of claim 97 further comprising:
the protective coating comprises a doped amorphous silica.

102. (withdrawn) The method of claim 98 further comprising:
the protective coating comprises a doped amorphous silica.

103. (withdrawn) The method of claim 99 further comprising:
the protective coating comprises a doped amorphous silica.

104. (withdrawn) The method of claim 100 further comprising:
the protective coating comprises a doped amorphous silica.

105. (withdrawn) The method of claim 101 further comprising:
the protective coating comprises a halide doped fused silica.

USSN 10/808,157

Attorney Docket No. 2003-0022-01

106. (withdrawn) The method of claim 102 further comprising:
the protective coating comprises a halide doped fused silica.
107. (withdrawn) The method of claim 103 further comprising:
the protective coating comprises a halide doped fused silica.
108. (withdrawn) The method of claim 104 further comprising:
the protective coating comprises a halide doped fused silica.
109. (withdrawn) The method of claim 105 further comprising:
the protective coating comprises fluorine doped fused silica.
110. (withdrawn) The method of claim 106 further comprising:
the protective coating comprises fluorine doped fused silica.
111. (withdrawn) The method of claim 107 further comprising:
the protective coating comprises fluorine doped fused silica.
112. (withdrawn) The method of claim 108 further comprising:
the protective coating comprises fluorine doped fused silica.
113. (provisionally withdrawn) A high power narrow band, high repetition rate laser light source system line narrowing method comprising:
utilizing a line narrowing optic mounting frame comprising a first material and a relatively flat mounting surface area;
utilizing a line narrowing optic comprising a second material having a coefficient of thermal expansion different from that of the first material of the mounting frame;
providing a flexure mount formed in the mounting frame that is flexible in a flexure axis corresponding to a longitudinal axis of thermal expansion of the mounting frame and the line narrowing optic;

LISSN 10/808,157
Attorney Docket No. 2003-0022-01

providing a flexure force mechanism made of the second material or a third material having a coefficient of thermal expansion that is essentially the same as that of the second material;

providing a flexure force mechanism slot generally aligned with the flexure axis and sized to snugly fit the flexure force mechanism between a slot wall at one end of the flexure force mechanism slot and the flexure body at the other end of the flexure force mechanism slot.

114. (provisionally withdrawn) The method of claim 113 further comprising:
pre-stressing the flexure with the flexure force mechanism.

115. (provisionally withdrawn) The method of claim 113 further comprising:
the line narrowing optic is a grating.

116. (provisionally withdrawn) The method of claim 114 further comprising:
the line narrowing optic is a grating.

117. (provisionally withdrawn) The method of claim 113 further comprising:
the line narrowing optic is a tuning mirror.

118. (provisionally withdrawn) The method of claim 114 further comprising:
the line narrowing optic is a tuning mirror.

119. (withdrawn) A high power narrow band, high repetition rate laser light source system line narrowing method comprising:
utilizing a grating mounted on a grating mount;
utilizing a high speed actively controlled electro- or magneto-sensitive bending or twisting actuator means attached to either the grating or the grating mount to actively control the bending or twisting of the grating.

120. (withdrawn) The method of claim 119 further comprising:

USSH 10/808,157
Attorney Docket No. 2003-0022-01

the electro- or magneto-sensitive bending or twisting actuator means is a plurality of electro- and/or magneto-sensitive bending or twisting actuators.

121. (withdrawn) A high power narrow band, high repetition rate laser light source production method comprising:

utilizing an optical element exposed to high fluence DUV light comprising a reflective metallic layer;

utilizing a purge system comprising a purge gas comprising hydrogen, exposing the optical element to the purge gas during exposure to DUV light.

122. (withdrawn) A high power narrow band, high repetition rate laser light source system optical element restoration method comprising:

utilizing a vessel;

providing an optical element which has been exposed to high fluence DUV light comprising a reflective metallic layer in the vessel;

utilizing a purge system means comprising a purge gas comprising hydrogen connected to the vessel, exposing the optical element to the purge gas;

utilizing a source of DUV light, irradiating the optical element reflective metallic layer.

123. (withdrawn) A method for removing an oxide of a metal comprising a reflective coating on an optical element utilized in a DUV light source which oxide was formed under exposure to DUV light during operation of the DUV laser light source, in the presence of oxygen, comprising:

providing a gas supply for exposing the optical element to a source of hydrogen while irradiating the optical element with DUV light.

124. (withdrawn) The method of claim 123 further comprising:

the gas supply is connected to an enclosure in the DUV light source during operation of the DUV light source.

USSN 10/808,157
Attorney Docket No. 2003-0022-01

125. (withdrawn) The method of claim 123 further comprising:

the gas supply is connected to an enclosure separated from the DUV light source during operation of the DUV light source.

126. (withdrawn) A high power narrow band, high repetition rate laser DUV light source system optical element protection method comprising:

utilizing a mounting recess;

utilizing a seal member contained within the mounting recess and subject to deterioration when exposed to DUV light;

providing an annular DUV shield on the optical element interposed between the DUV light source and the seal member.

127. (original) A high power narrow band, high repetition rate laser light source system line narrowing unit comprising:

a line narrowing optic mounting frame comprising a first material and a relatively flat mounting surface area;

a line narrowing optic comprising a second material having a coefficient of thermal expansion different from that of the first material of the mounting frame;

a flexure mount formed in the mounting frame that is flexible in a flexure axis corresponding to a longitudinal axis of thermal expansion of the mounting frame and the line narrowing optic;

a flexure force mechanism made of the second material or a third material having a coefficient of thermal expansion that is essentially the same as that of the second material;

the flexure force mechanism comprising an elongated rod;

a flexure force mechanism slot generally aligned with the flexure axis and sized to snugly fit the flexure force bar between a slot wall at one end of the flexure force mechanism slot and the flexure body at the other end of the flexure force mechanism slot;

a lateral expander made of the second material and comprising at least one mounting point for the line narrowing optic.